

HP Performance-Optimized Datacenter, 6 m (20 ft) Site Requirements Information



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Intended audience

This document is for the person who installs, administers, and troubleshoots servers and storage systems. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

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Site requirements

About this document

This document outlines the installation requirements for a 6 m (20 ft) HP POD. These guidelines are for a qualified architectural or consulting engineering team to generate site-specific documents for each HP POD installation. The site-specific installation documentation must comply with local building code jurisdictions.

Site preparation

The HP POD must be installed on a surface capable of supporting approximately 24,948 kg (55,000 lb). The site location for the HP POD must be level +/- 0.5 degrees tolerance. Appropriate clearance for installation, service, and system utilities (power and water) must also be considered.



IMPORTANT: Before installing the HP POD, consult your local AHJ for applicable codes and to review site-specific location guidelines.



IMPORTANT: The HP POD is designed for ground level installation. If you install the HP POD on an elevated surface, make sure the minimum height requirements for circuit breaker actuators are considered per local and national electric code requirements.

The area in front of the outside panels must include a work platform. The distance from the work platform surface to the center of any circuit breaker actuator handle must not exceed 183 cm (72 inches). The platform must be a minimum of 91 cm (36 inches) wide for free air, and if the platform construction is grounded metal, must be a minimum of 107 cm (42 inches) wide.

Safety information

The HP POD is certified to UL 69050/IEC 60950 as an Information Technology Product and Classified according to the National Electric Code NFPA-70, 2008

The HP POD is not suitable for long term human occupancy. The HP POD has service access areas for periodic maintenance and service. These areas must be used only by owner-authorized personnel who are trained in the maintenance and service of the HP POD IT components.



IMPORTANT: Before installing the HP POD, consult your local AHJ for applicable codes and to review site-specific location guidelines. If needed, obtain any necessary permits.

Before installing your HP POD, verify that the following prerequisites have been met:

- All components have been delivered to your facility.
- The HP POD, power distribution components, and water distribution components are in their final location.
- You have facility power at your final location.

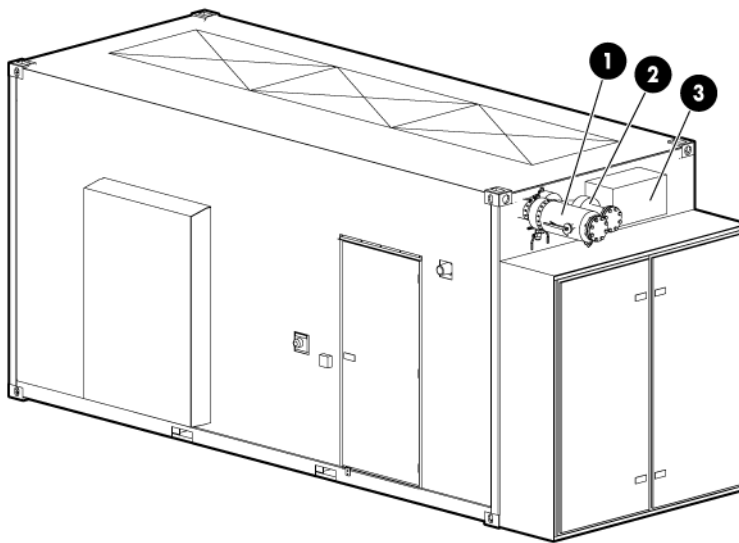
- You have chilled water at your final location.
- You have made provisions for properly grounding the HP POD.

System utilities

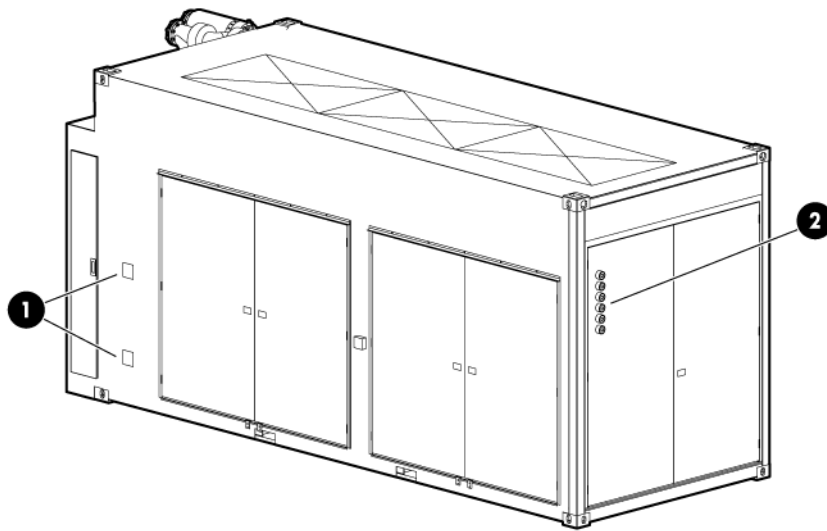
Your site location must accommodate the following utilities:

- Cooling water
- Electrical power
- Drainage

Power

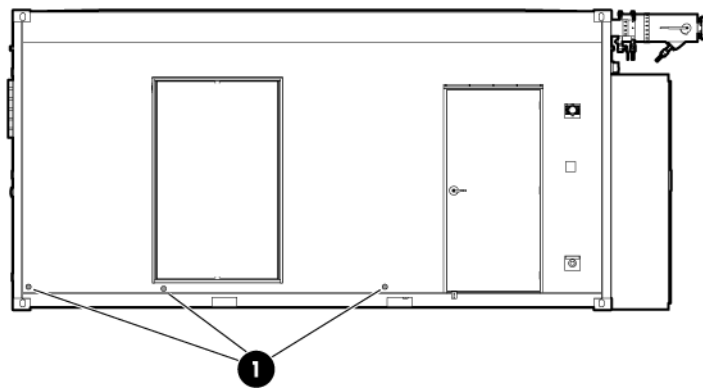


Item	Component
1	Chilled water supply connection
2	Chilled water return connection
3	External communication box (if fitted) <ul style="list-style-type: none"> • ECS • Fire • Security • Telephone

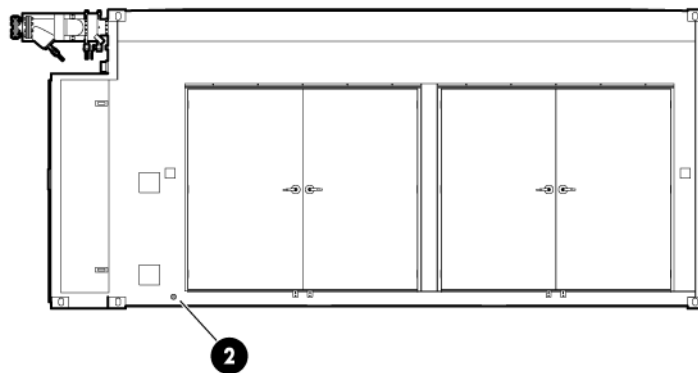


Item	Component
1	Main input power junction boxes
2	IT cable portals

Drainage



Drain hot aisle view



Item	Component
1	Water main supply/return drains
2	Heat exchanger condensate drain

Optional connections to central facility infrastructure

- HP POD ECS
- Life safety systems
- Convenience outlet power
- Site networking connection
- Domestic water for optional humidifier
- Security system (optional)

Environmental considerations

- (Optional) Install under a properly engineered awning.
- Install lightning protection for the HP POD.
- Make sure that the HP POD is installed in a well lit area that complies with local workplace lighting regulations.
- Make sure that the HP POD is properly grounded.
- Avoid placing the HP POD directly along a drainage path or in an area prone to flooding.

Environmental specifications

Features	Specifications
Operating temperature	-18°C to 54°C (-0°F to 130°F). Supports to -29°C (-20°F) with optional cold weather protection installation.

Features	Specifications
Nonoperating temperature*	-29°C to 54°C (-20°F to 130°F)
Operating humidity	<ul style="list-style-type: none"> • 0% to 100% relative noncondensing
Nonoperating humidity*	<ul style="list-style-type: none"> • 5 to 95% relative noncondensing • 39°C (102°F) maximum wet bulb temperature
Operating altitude	-76.2 to 3,048 m (-250 to 10,000 ft)
Non-operating altitude	-76.2 to 9,144 m (-250 to 30,000 ft)

*For nonoperating specifications, consider the temperature of computer and IT equipment inside the HP POD.
The HP POD must be drained before it is moved to a new location.
For areas prone to freezing, take appropriate water freeze protection precautions.

Lightning protection

If the HP POD is installed in an outdoor environment, then HP recommends hiring a lightning protection consultant to evaluate potential lightning risks and assess possible HP HP POD lightning protection schemes.

HP POD specifications

Dimensions

The HP POD is approximately 6.7 m (22 ft) long, 2.4 m (8 ft) wide, and 3.1 m (10 ft) tall.

Weight

HP POD weight varies, depending on whether the HP POD is empty or configured with IT equipment. Computer racks and IT equipment add incremental weight to an empty HP POD and vary, depending on customization.

Specification	Approximate weight
Empty HP POD	7,727 kg (17,000 lb)
Maximum weight of IT equipment for each rack	1,364 kg (3,000 lb)
Maximum weight of IT equipment for each HP POD	13,640 kg (30,000 lb)
Fully outfitted HP POD	22,500 kg (49,500 lb)

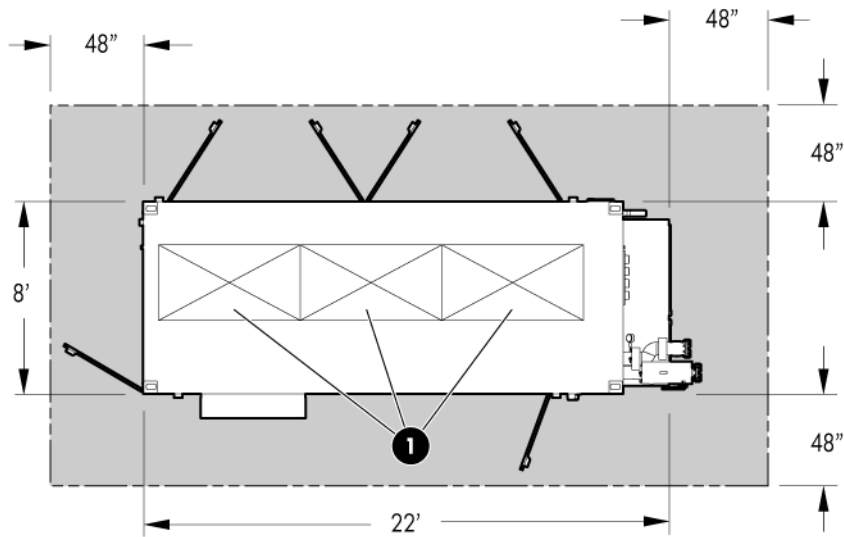


IMPORTANT: Before moving the HP POD to a new location, HP recommends contacting the local Department of Transportation for permit loads and other transportation requirements.

Required clearances

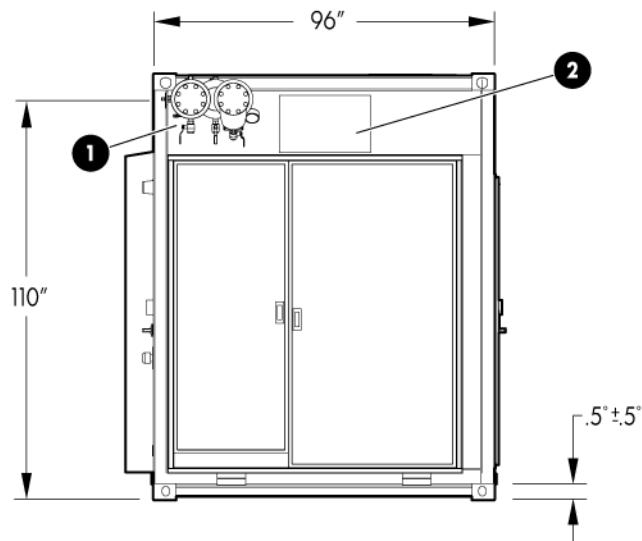
NOTE: Shaded areas indicate required clearances.

Top view



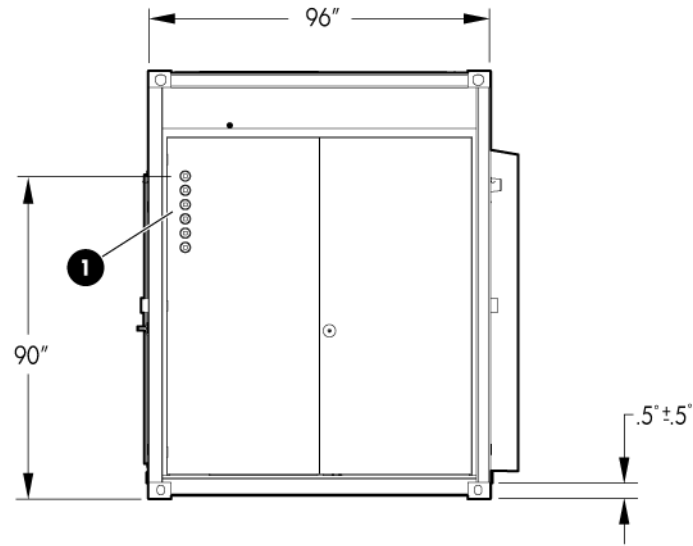
Item	Component
1	Heat exchanger access panels

Water input side view



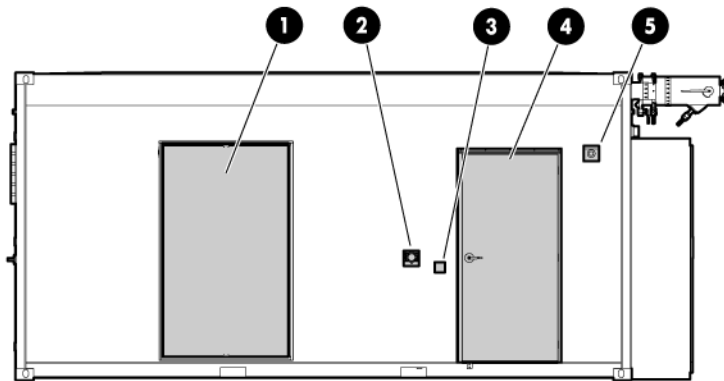
Item	Component
1	CWR/CWS portal
2	Central facility infrastructure connection: <ul style="list-style-type: none"> • HP POD ECS • Fire • Security • Phone • Convenience outlet power

Double door end view



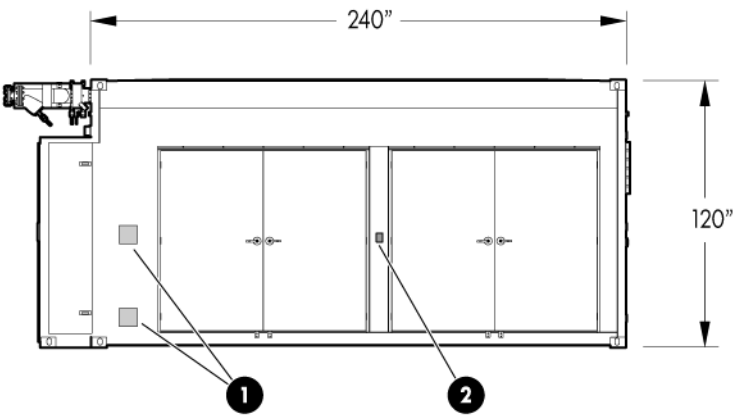
Item	Component
1	IT cable portals

External cold aisle view



Item	Component
1	Fire suppression and humidifier cabinet
2	EPO button
3	Controlled access keypad (optional)
4	Entry door
5	EPO strobe light

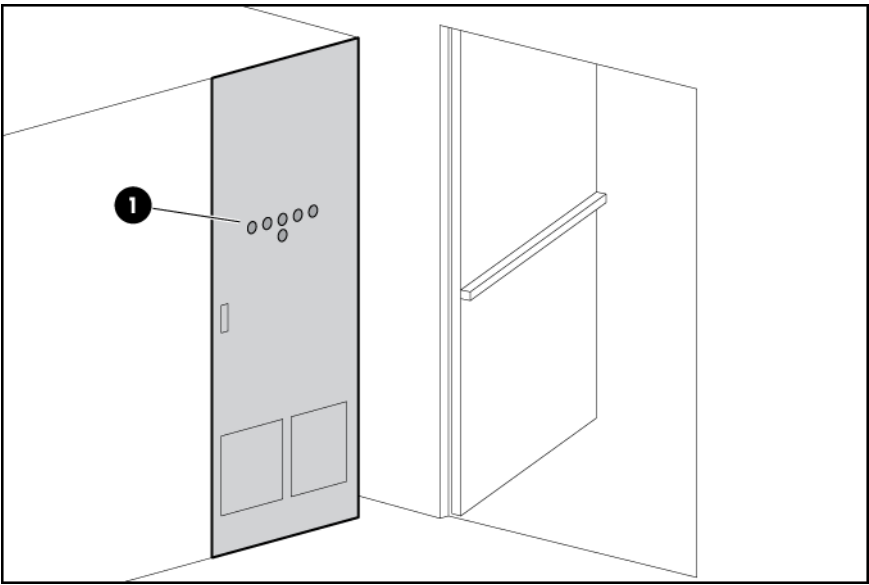
External hot aisle view



Callout	Feature
1	Main input power A and B feeds
2	Controlled access keypad (optional)

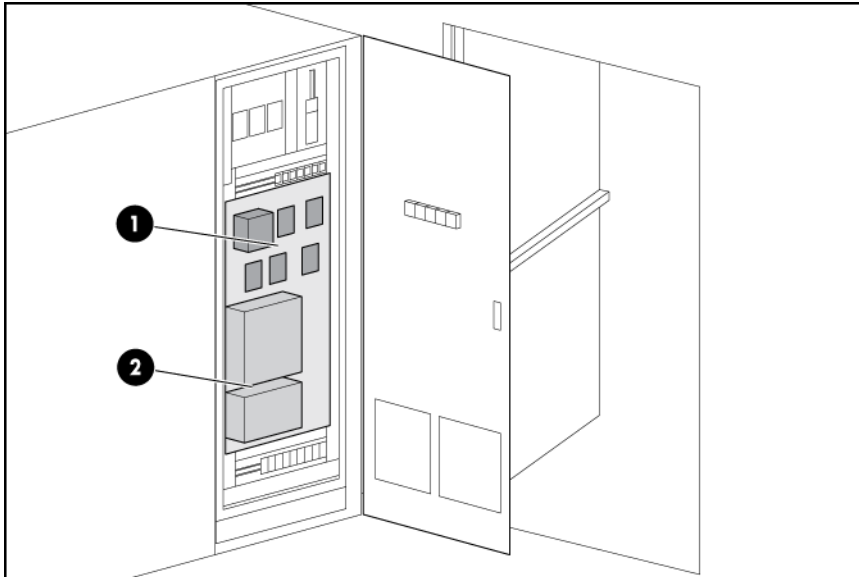
Internal components

The actual location of various components or subsystems in your HP POD might vary from this documentation. For final placement specifications, see your operations and maintenance manual.



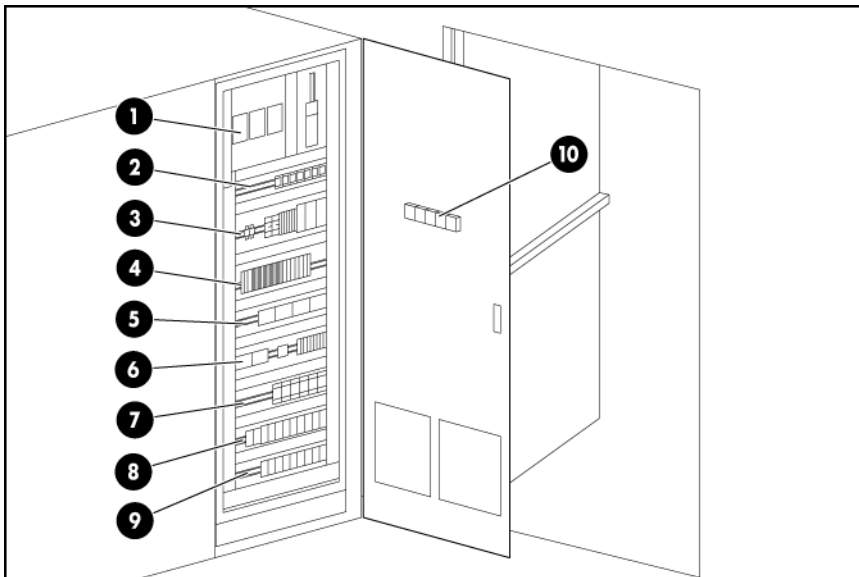
Item	Component
1	EPO controls and indicators

Control cabinet interior



Item	Component
1	Access control system components
2	Fire alarm/fire suppression system components

Component backwall



Item	Component
1	ASSD
2	EPO
3	Transformers and meters
4	ECS/PLC/IO components
5	Power monitoring
6	Current transducers

Item	Component
7	Fan sequencers
8	Fan power relays
9	Redundant power relays
10	EPO controls and indicators

Water supply specifications

Feature	Specification
Facility input temperature to HP POD	12° to 24°C (55° to 75°F)
Working pressure	1034 kPa (150 psi)
HP POD pressure drop	1732 kPa (25 psi)
HP POD water flow rate	454 l/min (120 gal/min)
Cooling water supply and return connections	North America: Two 7.62 cm (3 in.) ASME B16.5 class 150# flanges International: Two DIN PN16 DN80 flanges
Humidifier	See the humidifier manual for exact requirements

Water quality requirements

Water quality requirements and specifications

- Closed-loop water must not contain any lime scale deposits or loose debris.
- The chilled water temperature to be supplied to the HP POD must be 12° to 24°C (55° to 75°F).

NOTE: Freezing water might cause a blockage and damage to the unit. In outside locations subject to freezing temperatures, an additive such as glycol might be necessary to lower the freezing point. However, since the heat transfer potential of water with glycol is lower, the HP POD must be derated accordingly.

NOTE: The water cycle must be drained completely, and then purged using compressed air when storing or transporting at or below freezing temperatures.

Acceptable water quality specifications

Water must be maintained per the following acceptable water quality standards.

Parameter	Range
pH	8.0–10
Specific conductance at 25°C (77°F)	0–2500 μ mhos/cm
Alkalinity ("M" as CaCO ₃)	150–1000 ppm
Sulfur (SO ₄)	0–150 ppm
Chloride (Cl)	0–100 ppm
Hardness (CaCO ₃)	0–350 ppm
Calcium hardness (CaCO ₃)	0–200 ppm
Magnesium hardness (CaCO ₃)	0–150 ppm
Copper (Cu)	< 0.20 ppm
Iron (Fe)	< 3.0 ppm
Aluminum (Al)	< 0.50 ppm
Sodium (Na)	0–1000 ppm
Silica (SiO ₂)	0–150 ppm
Zinc (Zn)	< 1.0 ppm
Manganese (Mn)	< 0.1 ppm
Phosphate Ortho- (PO ₄)	< 3 ppm
Bacteria	< 1000 CFU/ml
Suspended solids	< 10 ppm

If your water is out of range, consult a water quality expert.

Piping materials

Do not use the following interconnecting piping materials in a closed water system:

- Oxidizing biocides
- Aluminum components
- Brass components with high levels of zinc
- Non-stainless steel iron components

Water precautions

Take the following precautions before installation of the HP POD:

- Verify that all foreign matter and particulates are flushed from the system. Water might be discolored during the initial flushing of the system. Clear running water is the sign that all foreign matter and particulates have been flushed from the system.
- Evaluate the short-term and long-term system requirements against the available water capacity.
- Ensure that the chilled water loop is properly designed for liquid cooling systems and is separate from the sanitary water systems in your building (bathroom, sink, drinking water).
- Ensure facility managers are aware of the additional load being added to the chilled water supply of the building. Be aware that the added heat load might affect other components being cooled by the chilled water plant.

Condensation management



CAUTION: During operation, avoid leaving the HP POD doors open, to maintain accurate environmental conditions inside the HP POD.

Supply cooling water that is above the dew point inside the HP POD to prevent condensation forming on the heat exchangers.

The heat exchanger drip tray will collect any condensation that forms on the heat exchangers. This collected condensate drains out of the HP POD through the heat exchanger condensate drains. HP recommends connecting condensate drains on the HP POD to a facility drain to prevent collection of water near the HP POD.

There is one heat exchanger condensate drain outlet located near the bottom of the HP POD in between the access doors on the hot aisle side. There are three drains for the water main supply and return lines located near the bottom of the HP POD on the cold aisle side.

To avoid excessive buildup of condensate and to conserve energy, raise the cooling water temperature to above the dew point to manage condensation while maintaining the necessary cooling capacity.

Power management

Connection requirements

When determining the final location of your power and water connections, consider the distance between the facility utilities and the HP POD.

The facility power connection must be installed in compliance with local electrical codes and regulations.

HP can provide engineering services to develop the site installation plan and drawings as a supplemental service.

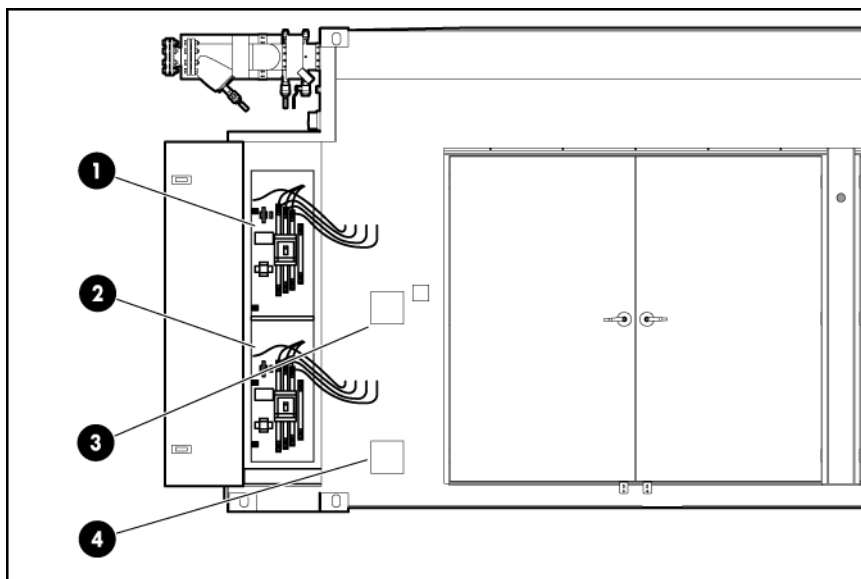
Power requirements

The HP POD is available in North American and International models. Both models provide 145 kW redundant or 290 kW non redundant power for the critical load.

- The North American HP POD includes step-down isolation transformers and requires two 400A, 480V, 3-phase delta feeds at 50-60 Hz.
- The International HP POD does not require transformers and requires two 400A, 380-415V, 3-phase wye feeds at 50-60 Hz. All 3-phase HP POD feeders require that the neutrals and the equipment grounding conductors remain isolated. Bonding of the two conductors is allowed at the power source only.

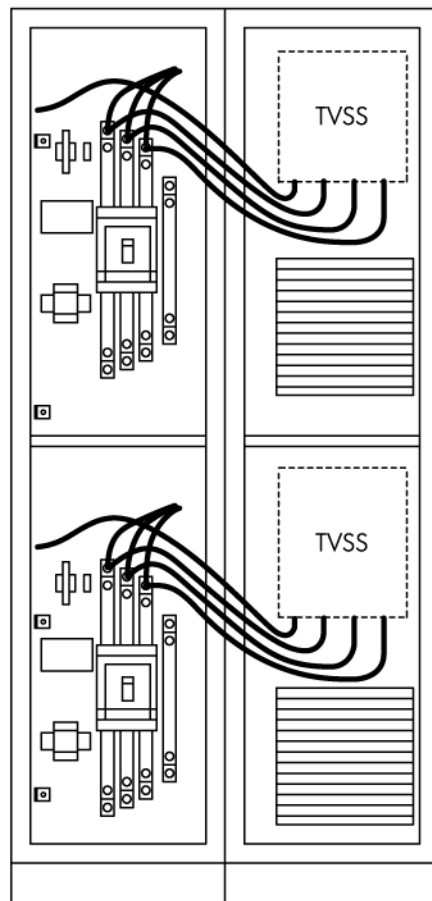
For higher density loads that require more power capacity, both 400A inputs can be fed from the same source. When a lower density critical load is used, N+N redundancy can be accomplished by connecting the two 400A feeds to independent sources.

Main input power



Item	Component
1	Main input power side B lugs and breakers, located behind dead front panels.
2	Main input power side A lugs and breakers, located behind dead front panels.
3	Landing/penetration portal B for attaching incoming conduit connections for the main input
4	Landing/penetration portal A for attaching incoming conduit connections for the main input

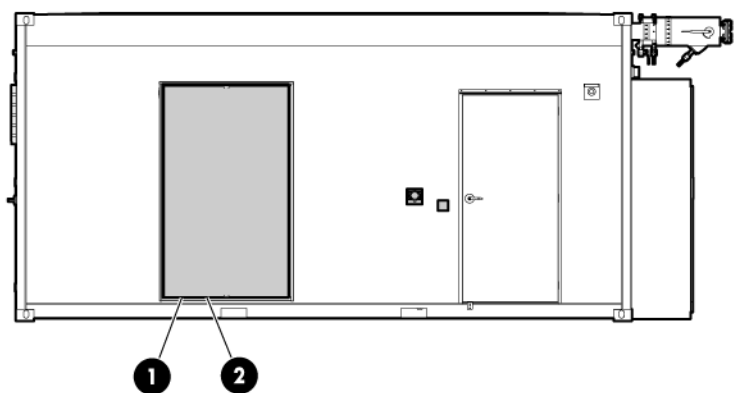
Main input power details



Supported facility connections

Humidifier specifications

A dedicated supply of domestic water is required if the optional humidifier is installed. For exact requirements for the humidifier model that was installed, see the humidifier manual supplied with the HP POD.



Item	Component
1	Humidifier drain
2	Water supply

For more information about the humidifier, see the documentation developed by the humidifier manufacturer.

Convenience outlets

The HP POD is prewired for a convenience outlet on the inside of the unit. This circuit is not part of the power provided by the main switchboard feeding the 3-phase power to the HP POD. To energize this circuit, you must supply a dedicated single phase, 16-or 20-amp branch circuit from your facility at the appropriate voltage. Make sure that the branch circuit is connected to the prewired exterior mounted junction box and must be wired in accordance with local regulations and codes.

Grounding requirements

The neutrals and equipment grounding conductors for all 3-phase HP POD feeders must remain isolated. The two conductors can be bonded at the power source only.

Functional and supplementary grounding straps are provided between each rack and HP POD.



IMPORTANT: Before installing the HP POD, consult your local AHJ for applicable codes and to review site-specific location guidelines.



IMPORTANT: You must ground the HP POD to your ground grid system for full protection.

IT cable portals

Six 63.5-mm (2 ½-inch) IT cable portals on the double door end of the HP POD are available for optional Ethernet, fiber optic, and IT cable configuration. These components are also used for optional ECS configuration and can support dedicated lines, a customer network, and various other communications service options. You may install a weatherproof box for termination points on the outside of the HP POD over the cable portals.

Examples of cables that can run into the 63.5 mm (2 ½ inch) portals are as follows:

- 48 Cat-6 cables
- 39 12 strand multi-mode or single-mode fiber optic cables

HP POD security

The HP POD is equipped with standard key lock hardware at each entry door and external panel. Conduit and junction boxes are provided for customer-installed controlled access systems.

Optional controlled access security includes a 12 digit security code keypad and magnetic locks on all entry doors.

HP POD Environmental Control System

The HP POD ECS is a stand-alone system and does not require any connections to existing facility management infrastructure. You can choose to connect to the facility BMS at additional cost. BMS configuration communicates through an Ethernet cable connected to the internal HP POD ECS panel jack located inside the junction box. HP POD ECS data can be sent and viewed to a set IP address.

The HP POD ECS communicates through Modbus TCP protocol. Modbus TCP is a data communication protocol for building automation and control networks.

The ECS offers:

- The ability to monitor status of water and air temperatures, water pressures, and water flow rates
- Immediate notification of all supported alarm messages
- Real-time power consumption

For additional points that can be monitored, see the I/O (Input/Output) Controls Points List.

Fire, safety, and security notifications

Dry contacts are provided to enable the connection between the fire alarm system and the central facility fire detection system, relay alarm, and trouble conditions at each HP POD.

Your building fire, safety, and security system relays the following alarms, which operate independently of each other.

Alarm	Meaning	Solution
Smoke alarm	Smoke has been detected in the HP POD.	Activate the EPO. Follow standard emergency procedures for your facility.
Security	A security breach has occurred.	Follow standard emergency procedures for your facility.
EPO	Someone has activated the EPO system and shut down the HP POD.	Follow standard emergency procedures for your facility.

The electrical layout of the fire alarm system is as described in the schematic drawing supplied with the HP POD.

Acronyms and abbreviations

ASSD

air sampling smoke detector

BMS

building management system

ECS

environmental control system

EPO

emergency power off

POD

Performance-Optimized Datacenter

TVSS

Transient Voltage Surge Suppression